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☞See advertisement on last page.

Poetry.

WORDS FOR TO DAY.

When first we wake to that great thing,
The consciousness of power,
It is not 'mid the gales of Spring,
Nor in the Summer bower;
Stern the voice the truth to tell—
Rugged the hand to guide—
Bitter the struggles of the soul—
By wo is manhood tried.

And well—oh! well we have been tried,
And well have we endured—
The weary time at last is o'er,
The triumph is insured.
Thou who hast seen thy stricken and,
Nor felt thy heart to break;
Remember! oh, remember, thou
Art living for her sake.

Tho' all seem crush'd, and black, and dread,
The germs are sound within,
Of Love, and Hope, and Happiness
And thou their bloom shalt win—
If 'twere as black as thunder-cloud,
As cold as Winter snow,
The smile of God is still above—
The breath of God below.

It is the noblest effort here
To triumph o'er despair—
What angel power thou mayst acquire,
Who shall the struggle dare—
Believe that all the germs of night
Are hid in suffering—
It is the iron casket of
The talismanic ring.

Thou who nor loved, nor suffered, know
Thou dost but live in part—
A strange new land thou'lt enter when
Those feelings rule thy heart—
Thy soul shall ripen in their breath,
And clothed in glory be,
And feel the exerting consciousness
Of immortality.

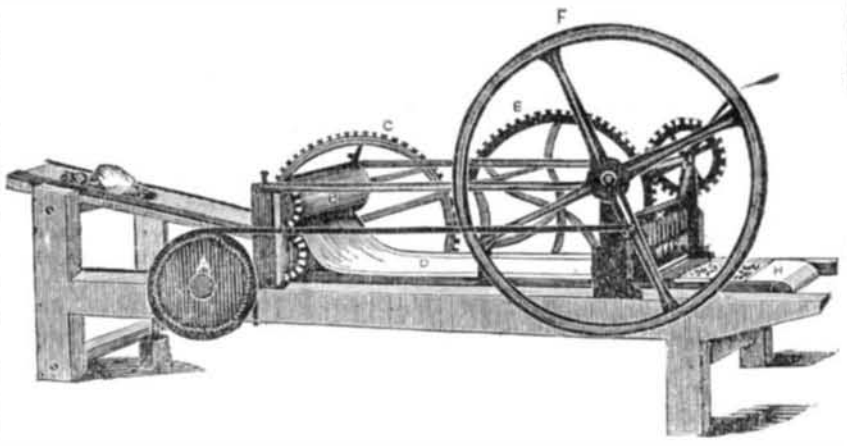
FEARLESS AND FAITHFUL.

Labor fearless, labor faithful,
Labor while the day shall last,
For the shadows of the evening
Soon thy sky will overcast.
Ere shall end thy day of labor,
Ere shall rest thy manhood's sun,
Strive with every power within thee,
That the appointed task be done.

Life is not the traceless shadow,
Nor the wave upon the beach,
Though our days are brief, yet lasting
Is the stamp we give to each.
Life is real, life is earnest,
Full of labor, full of thought:
Every hour, and every moment
Is with living vigor fraught.

Fearless wage life's earnest conflict,
Faithful be to thy high trust,
If thoul't have a memory cherished,
And a path bright as the just.
Labor fearless, labor faithful,
Labor until set of sun,
And the welcome shall await thee,
Promised plaudit of "*well done.*"

NEVINS'S
CRACKER AND BISCUIT MACHINE.



This is a machine which has long been in contest for the infringement of the invention and a final settlement has been kept back on account of a defective specification. The inventor is Mr. W. R. Nevins, of this city, and the contested point has been set up in defence that this machine was the same as one already patented by a Mr. Poole. The old patent specification was defective, and obtained previous to 1836, and has been surrendered and a reissue obtained under the management of C. M. Keller, Esq. now of this city. This machine carries the dough forward from feed rollers, on an endless web to cutters, and the web after this carries forward the cut biscuit or crackers past the cutters to be lifted therefrom by a person attending the machine. This is the distinctive feature of the invention wherein it differs from Poole's and all others, for Poole's cuts the dough on a stationary table and pushes off, not carries the crackers. We published in No 8 of this vol. of the Scientific American, a cut of Mr. Nevins's improvements on this machine, but a contested point in a patent is always of interest to inventors and patentees.

DESCRIPTION.—The dough is placed upon the feed table to the left, from which it is taken by feed rollers B, which roll it out the proper breadth as represented in the cut by D, and on it carried forward to the cutter box X, passing under a cutter plate where the cutters act by reciprocating motion communicated by the two cranks which attach the cutters to the driving shaft, known by the handle seen in the cut on the other side, connected to the axle of the small cog wheel. The crackers being thus cut, they are carried forward past the cutter box, and the web passes over H, a roller, in returning. As the biscuit are cut by a reciprocating motion, the feed motion, therefore, must be alternate. This is done by a weight passing over a grooved pulley A, connected by a chain or cord with a crank pin on the fly wheel F, so that the feed motion and the cutting motion are both in unison by the crank gearing. The crank pin is fixed in a slot so that large and small biscuits may be cut by shifting it therein, and the feed and cutting motion thereby always working in unison. E, is an intermediate wheel which meshes into C, to operate the feed rollers, all receiving their motion from the small cog wheel on the axle of the crank handle. The point of improvement in Mr. Nevins's new machine is the feed motion being regulated by a rocking shaft placed on the same side of the machine that the handle is fixed, and the fly wheel thus disencumbered of the dragging weight of the feed motion at the point represented in the above cut: consequently the new machine is operated with more ease than the old one. Mr. Nevins has lately invented a new mixing and kneading machine which is destined to work a complete revolution in that most severe branch of the biscuit baking business, a cut of which will soon appear in the Scientific American.

Amerlean Agricultural Implements.

A number of American agricultural tools were taken over to England by a Mr. Slocum for trial with English implements, and the trial by a committee eventuated as follows. The best Northampton, and Howard's Champion plough required to turn a furrow on a clay soil 5 inches deep, and 11 inches wide, a draught of 420; the American plough 5 inches deep and 15 wide, 364. The next trial was at 8 inches deep and 11 wide, the English plough required 644 pounds, the American 588 pounds The triers remarked: "In justice to the American plough, we must say, they cut and turned their furrows quite as well as the others, breaking the land to pieces, indeed they are the most simple, light, strong, efficient, ploughs that it is possible to conceive."

The fanning mills were equally as superior They say, with the exception of cleaning out white caps, they "are quite equal to our best machines, and one man is able to fill more chaff into it than two can put into any of our machines; but its greatest recommendation is its cheapness, simplicity, efficiency, and expedition." "Mr. Slocum's hand machines are the strongest, lightest and most perfect articles that ever came under our notice."

This result is rather credible to the ingenuity and good judge ment of the "Universal Yankee Nation."

Water Cure.

It is surprising to observe what great cures have been effected by the simple use of water, which has now become a most valuable auxillary to the *materia medica*. A patient in one of the cold water asylums of Mass, says, after five months treatment, that he weighed 127 pounds when he entered the asylum, and has been relieved of thirty-three pounds of bad flesh, and now feels that he has been made over The water cure is arresting the attention of our most scientific Doctors.

Singular Error.

By a recent survey of Chester Co., Pa., made by accurate surveyors for the purpose of having a map drawn, it appears that Mr. Wm. Smith, who has for the last two years been a member of the Assembly of Delaware actually resides within the boundary of Pennsylvania, his dwelling being about four hundred yards from the Delaware line.

RAIL ROAD NEWS.

Broad and Narrow Guages.

Out of 3400 miles of British Railroads now opened only 300 are upon the broad guage.—The broad guage is 7 feet wide, the narrow is 4 feet 8½ inches. Some trips have been made on the narrow guages lately which in point of speed have not yet been surpassed on the broad guage. But it any person wishes to be impressed with a feeling of awe for the mighty inventions of man, one who has stood upon the Pyramids of Egypt has said that he felt far deeper sensations when he beheld a train pass him on the Great West Railroad than when gazing from the top of the Egyptian monument.

Whitney's Railroad.

The Committee of the U. S. House of Representatives appointed to examine into the merits of Whitney's project for a Railroad to the Pacific, have reported favorably, only one of the Committee, Mr. Maclay, reporting against it.

Nashville Railroad.

Mr. Garnet, the chlef engineer of this road has proceeded to examine the route for the first forty miles of the Nashville, Tenn. and Chatanooga Railroad.

New Railroad to Philadelphia.

A number of merchants and others in Philadelphia contemplate the construction of a new and independent railroad between that city and this.

The American Railroad Journal states that there are 77 Locomotive Engines on the Philadelphia and Reading Railroad.

We thought that the revolution in France would have unsettled the Railroads in that country, but it seems not. Our valuable exchange the *Journal des Chemins de Fer et des Mines*, has even come more regular since than before the revolution, and what is not a little pleasing to a republican the *red mark* of royalty has disappeared from the wrapper.

New Railroad Machine Shop.

The famous manufacturer of Locomotives, Norris of Philadelphia, has commenced a new machine shop at Schenectady, N. Y.

Connection between Lake Michigan and the Mississippi.

This interesting event has at length been accomplished by the opening of the Illinois and Michigan Canal, and has been duly celebrated at Chicago. This is an event, in which Chicago has a deep and direct interest, dre out the whole population of the town, and first boat was received with deafening cheers As if to make the baptism complete, a circuit of a mile or two was taken out in the lake. Upon passing out of the harbor, the boats were welcomed with a salute of a hundred guns. Thus has, at length, opened the Illinois and Michigan Canal. The long and eventful period that has marked its progress has at last been passed—the doubts and distrusts and uncertainties which long hung over it have vanished.

A locomotive named the "Lightning," an 8 wheel engine, with 8 feet driving wheels, made a trip recently in England of 53 miles at the rate of 75 miles an hour. The engine was perfectly steady at the highest speed.

The expedition in search of Sir John Franklin has reached Buffalo. New York, where it is to meet some persons from Montreal, who, together will set out for Hudson's Bay via Detroit, and the Salt St. Marie, in the prosecution of the voyage of exploration. Sir John Franklin, set out on this his last voyage of discovery in the year 1845.

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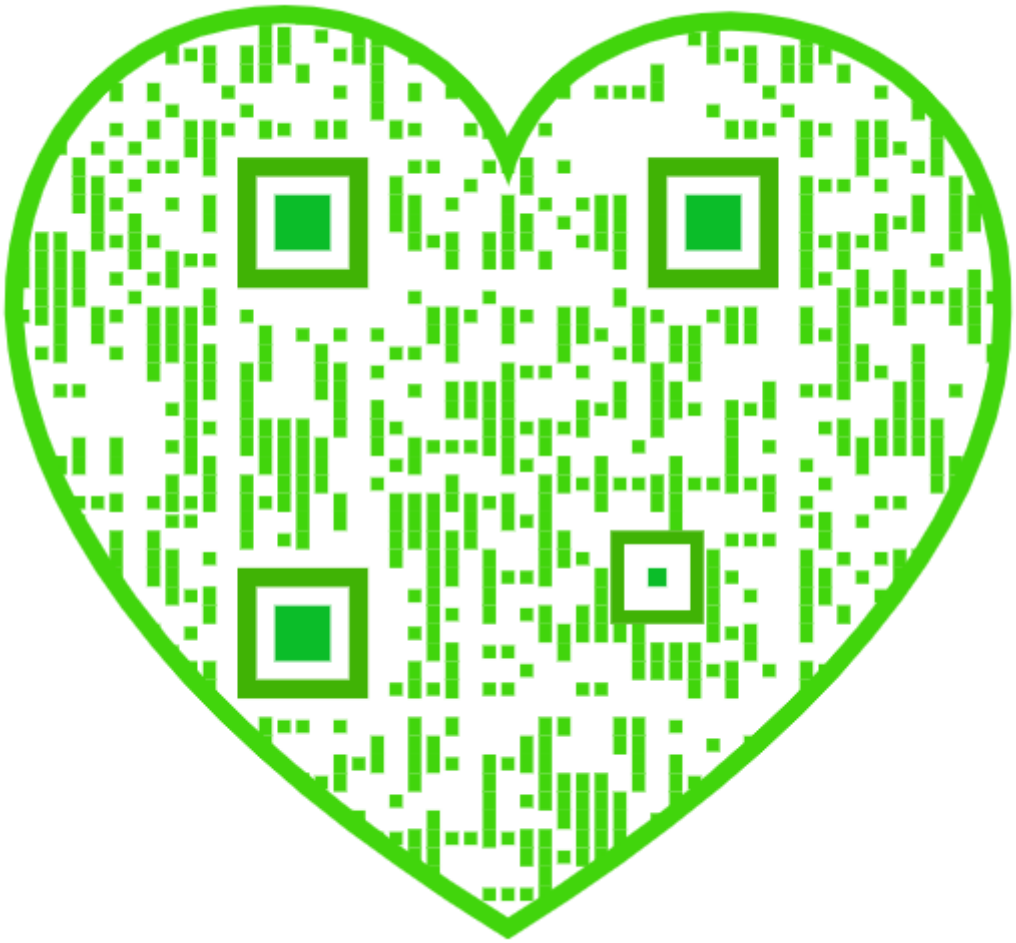

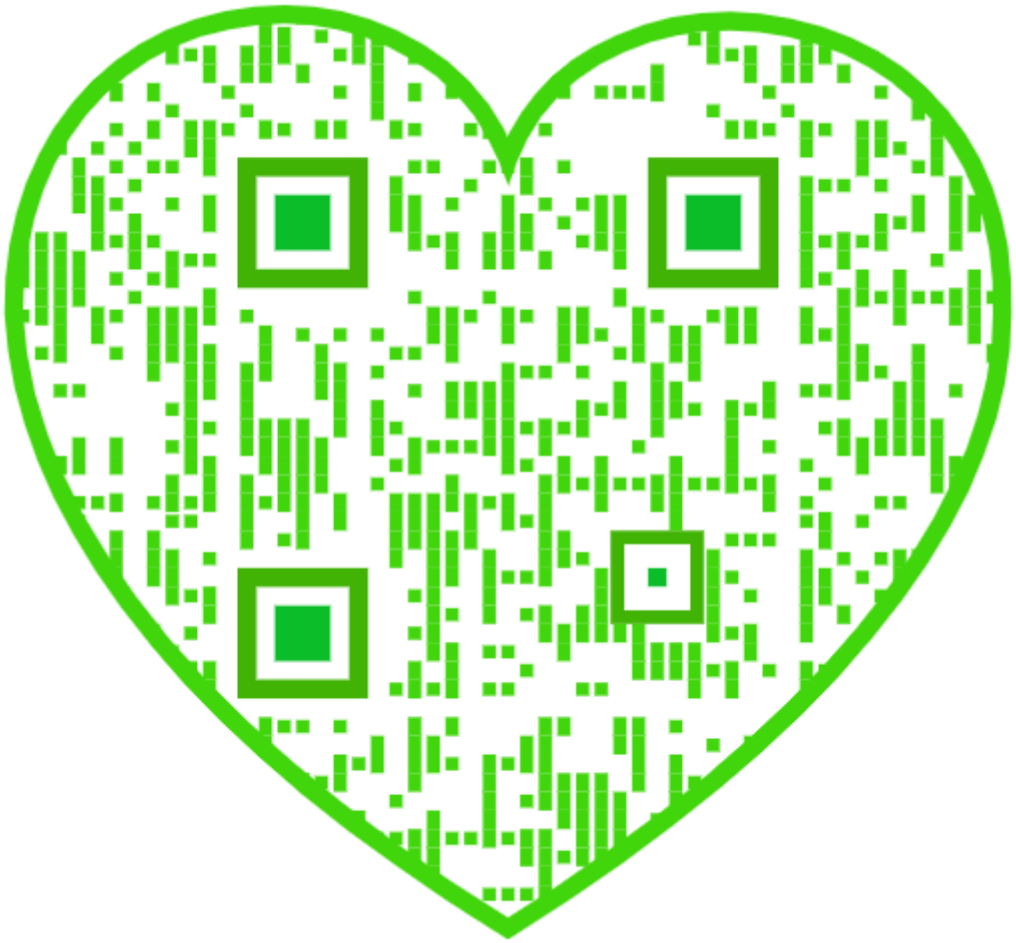

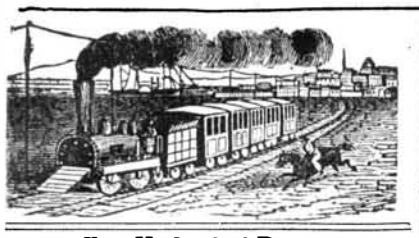

New Mechanical Power.

A correspondent of the American Courier, Philadelphia, communicates the following information to that paper.

Being on business in the West a few months since, I became acquainted with the inventor of a new motive power for machinery, which is destined to produce no little sensation among the theorists in Natural Philosophy. If the invention is not the disoovery of a new mechanical power, it is at least such a combination and application of known ones, that it may well be called the discovery of a new power. The inventor's name is Thomas Kealey, Esq., formerly from New York, but for several years past he has been, and now is a resident of Rollin, Lenawee, Co., Michigan. The motive or propelling power which Mr. Kealey has invented is obtained by means of weights, cords, and pulleys, connected by an ingenious contrivance with two heavy pendulums, suspended upon either side of the frame work of the machine. Across the tops of the pendulums are arms connecting with others which are attached to a balance-wheel and as one pendulum swings to the right, causing the balance wheel to revolve half around the other pendulum than swings to the left, completing the revolutiou of the wheel, and by this alternate motion of the pendulums, continued rotary motion of the wheel is secured. By increasing the number of levers, and ihe amount of weights, any desired velocity and momentum may be procured. The simplicity of its arrangement is one of its most striking features. There does not seem to be any question as to the applicability of the power to propel local machinery, and the inventor is confident that it can be applied to railway cars. But if only applicable to local machinery, as grist and saw mills, it will be of immense benefit to the whole country, as being the cheapest known motive power, and will be most particularly valuable in many parts of the West, where there is so little fall in the streams as not to afford any sites for mills. The inventor has furnished me with the following experiments with his new motive power, in a letter recently received. "I have just completed one power of two levers combined, each five feet long, and by an experiment obtained the following results:—The sweep of the end of the lever was 26 inches; one pound weight raised 36 pounds 6 inches; 7 1-2 pounds with the same lever and sweep, raised 36 pounds 40 1-2 inches. Thus you see I am ahead of time 14 1-2 inches, with 7 1-2 pounds of weight. I have as yet but one power completed, and when the two other powers or perpetual levers and pulleys are attached, from the above data, 20 pounds of weight will raise 2000 pounds one foot, with only 26 inches space for the sweeps of the levers."

[Those who understand the principles of mechanics will be somewhat amused by reading the above. According to the principles of mechanics, principles of the *composition of forces* which are the result of experiment and the most profound reasoning, illustrated by the infallible test of mathematics, we say that one pound travelling through a space of 26 inches will raise no more than four and one-third pounds 6 inches. Now this machine is made to raise 8 1-2 times this weight 6 inches. We venture to make the assertion that all the weight over 4 1-3 pounds lifted 6 inches, was the result of momentum received from some other source than the one pound, and in the last experiment mentioned above, there is a variation in the momentum communicated of 4 1-2 pounds, for the 7 1-2 pounds should have lifted the 36 pounds 45 inches high, according to the *one pound's* performance. It would save a vast amount of time, money, and trouble of mind, to many, were they better acquainted with the laws of mechanics.—Ed.

House's Printing Telegraph is in operation between this city and Philadelphia.

Paine's Steamboat.

We have noticed in a previous number of the Scientific American that Capt. Paine, of Worcester, Mass., had invented a novel steamboat, represented to be a perfectly new and superior invention. We have doubted the flattering accounts given of the invention and are not yet prepared to to pronounce it equal to our best marine steamers, and from a farther description of it by Capt. Morton, recently published in the Worcester Telegraph, we must say that fair and full e periments are yet wanting to decide its superiority, such as a voyage across the Atlantic. Capt. Morton says: "the mechanic unacquainted with the forces of the element with which his machine has to contend, produces a beautiful piece of mechanism with all its intricacy and combination of joints and levers, that on the bosom of a calm lake, with repair shops at every league, seems perfection; but when the mountain wave becomes its antagonist, its perfection goes down. Capt. Paine combines both these required qualities in an eminent degree, as his examination here has proven and his models demonstrated. There is one feature about the bow of his ocean steamer which, in my judgment, is a master-piece in naval improvements. You are aware that all sharp vessels are what is termed wet, and all our steamers are peculiarly sharp. Now to prevent a sea from washing their decks, *a sailor notion* has constructed a heavy, cumbrous, flaring bow. The action of the sea on this breastwork is similar to that of one of your old fashioned snow banks on a train of cars that fetch up in its embrace. It is true it stops the sea from boarding—and it stops her headway as well. Capt. Paine's bow, instead of flaring, recedes inwards from above the waist of the vessel, and the entrance of a sea on the decks is precluded by the light but strong arch thrown over the upper works, thus enabling the vessel to stem against a head sea without meeting those heavy shocks that all have experienced who steam the Atlantic. Many supposed that this peculiar feature in his vessel would cause her to bury or run under, but full experiments have demonstrated to the contrary and that this steamer will ride a sea superior to any afloat."

We hope that this invention may prove to be all that we would desire it, viz. a real improvement in mechanical and nautical science.

The Skull of St. Andrew Stolen.

Some eccentric robber carried off lately out of St. Peter's (where it was kept under three strong locks) the skull of St. Andrew, the Apostle, and the greatest excitement has since prevailed. A reward of $500 was offered in the Gazette by the Dean and Chapter of the Basilica, and it was found some days after in a sack of corn down at the lower quay, (Ripa grand,) ready for sail in a small schooner. The schooner was impounded and the crew imprisoned, but the real vagabond has not yet been got at. Several of the church attendants must have been cognisant of the abstraction: but the sailors and captain knew no more about the skull being in one of their bales, than did Benjamin about the Egyptian silver cup, which he carried off in utter innocence, three thousand years ago.

The reason why St. Andrew has been esteemed the popular saint of Scotland was the fact of his bones having been carried there by the first Christian Missionaries. It seems that Sandy had been hoaxed in that, after all sai and done, on St. Andrew's day.

Large Exportation of Fruit Trees.

The Propellor Boston, hence for Chicago, takes up 25,000 fruit trees of various kinds, consigned to the different ports on lake Michigan. These trees are for the most part, choice fruit and from the nurseries in the interior. We are glad to see the farmers of the west are alive to the importance of fruit, and that they are likely to be content with nothing short than the best varieties. No climate is better adapted to Horticultural purposes than that between Lake Michigan and the Mississippi.—*Cleveland Herald.*

The Duke of Buckingham has offered his Irish estates of 250,000 statue acres for sale. The rents were 55,000 dollars per annum.

Fruit and Farming. Chesnuts.

Mr. Editor:—I have been frequently amused, seldom instructed, in reading the proceedings of the Farmers' Club, which meets from time to time in New York As a general thing they are *in the rear* of the *advance guard.* They discussed the nature and uses of Gutta Percha about six months after the whole process of preparation was explained and illustrated in vol. 2 of the Scientific American. Drainage and fruit have also been subjects of discussion, all proper and excellent subjects, but it frequently happens that "far off fowls have feathers fair," and so it is in regard to counsellors and sages that would multiply and replenish our fair land with foreign fruits and flowers. There can be no doubt but the man who makes two stalks of grain to grow in place of one, is a greater benefactor to the human race than he who conquers cities. Yet it too often happens that in the search after something new, we neglect the improvement of what is old and useful and more profitable.

Here in our fair land we have the chesnut—a fruit natural to our soil and climate, but cultivated by no one with the same views and objects as the apple or peach. Now the chesnut is a valuable and nutritious article of food. The peasantry in various parts of Southern Europe enioy a breakfast of roasted chesnuts, although I must say they are larger and finer in those countries than we have them here, and this is the reason that induced me to write this letter knowing the interest you take in the progress of all science. It is my opinion that our Chesnut may be greatly improved by proper culture—there is no doubt in my mind but the Italian kind, which are the size of a small apple, might be successfully cultivated in America. This fruit is easily preserved and kept for a long time. I trust that some of our cultivators will give this subject their attention and place the chesnut in its proper position as an article of American diet and a natural fruit of our clime.

Yours, &c. S. R. J.

Brooklyn, May 1848.

Ancient Mechanical Arts,

The French considered it so great a feat to place the Obelisk (which was one solid piece of stone,) on board a vessel, and then convey it from thence to La Place Concorde, and raise its horizontal to a perpendicular position, that they deemed it worthy recording on its base, with representations of the machines by means of which it was done. And yet this Obelisk had been drawn from the quarries, and thus raised ages before, and by mechanics now unknown.

It is well known that in the tombs of Egypt were representations of the various arts then practiced.—A distinguished writer of the hieroglyphics thinks he finds there the representations of the five mechanical powers, the lever, &c. Even new patterns of dress, and new patterns for shawls, are taken from these tombs. Their cloth too, cotton, and linen, (and even the Muslin Delaine,) were found there of a superior quality. Most of the Mummy cloth was indeed coarse, but some has been found of great fineness, from one hundred and forty, one hundred and sixty to even five hundred and forty threads to the square inch. The porcelain of the Egyptians was very rich and beautiful; and here in passing, we have evidence of commerce in very early times. There is found in Egypt much of the China porcelain, so that there must have been commerce between these two distant nations. Canals, a boasted modern invention, were made and used by the ancients if not for travelling, at least to convey merchandise and burdens. Description of a canal across the valley of Goshen spoken of both by the French and English engineers; which has been filled up with sand, and again in modern times, in a great overflow of the river, has been filled with water. There is another occupying part of the space between the city of Thebes and its quarters; over the rest of the space is a road answering in great measure to our railroads, being evidently levelled by art, and paved with immense blocks of stone.

There is now living at Adams Centre, Jefferson Co., this State, a lady 62 years of age who weighs 404 pounds.

New Steamship America.

This splendid new vessel of the North American Royal Mail Company, arrived at this port last Saturday morning, having made the passage in 13 1-2 days. She is a beautiful model and her arrangements are excellent, utility more than elegance has been aimed at and yet everything about her is tasteful and neat. Between her windows are beautiful scenes in gilt frames of the Clyde and Hudson executed by a Scottish artist on papier mache. As our Glasgow correspondent predicted she has been much admired by our engineers. Her hull is painted entirely black, relieved only on the stern by carved work gilded, representing a North American Indian, and a backwoodsman in a reclining position, over which is a large spread eagle, well executed. On her bows she carries a colossal sized figure of the Goddess of Liberty, with the usual appendage of cap,

Sad Case of Hydrophobia.

By the Philadelphia papers we learn that Mr. William Knight, an accomplished engineer in the employ of Messrs. Norris, the famous locomotive builders, died lately by that most deplorable of all diseases hydrophobia. Mr. Knight it seems was bitten by a favorite dog of his own about three months ago and all this time has this mysterious poison been slumbering in his system. This is truly a disease that not only baffles our skill, but is beyond the reach of reason to fathom. We have much feeling on the death of Mr. Knight as he was a skilful machinist and was selected by Messrs. Norris to superintend their contract with the Austrian government for the Vienna Railroad. We have been often surprised, however, to see people fostering and petting dogs, while they had no use for them whatever.

An Artful Creature.

She got Mr. Jones by her cunning. He was a timid young man, and very bashful, and did not come up to the scratch as my brother Jack calls it: so after two or three letters had passed between them, she showed me a letter she had written to him, and the artful creature spell'd her Christian name with two *r's*, so that it read thus—Marry Ann Smith;" and the poor creature took the hint, and did marry Ann Smith.

Australian Wheat.

A few months ago 2000 bushels of wheat was sent from Melbourne, Australia, to England. It is said to be of most excellent quality, and had grown in three months and one week. The crop was fifty bushels to the acre.

Fix the Date.

At Stourbridge, England, a musical festival took place for the relief of the poor, at which Mr. Russell sang, "There's a good time coming." At the conclusion of the melody a farmer stood up, and addressing the vocalist, said, "Mr. Russell, you could not fix the date could you?"

The Journeyman Millwrights of Philadelphia, have made, we are informed a demand upon their employers, for the establishment of a regular price for their work—1,50 per day of ten hours, and to be paid full wages weekly for full time, and so on in proportion for time made.

There is a paper printing establishment in Newark, N. J., which does all the work by machinery. One machine attended by a man and a boy does as much work as 16 men by hand could do.

Orders have been received at the Navy Yard Charlestown, Mass., to prepare the line-of-battle ship Vermont for launching. She has been on the stocks upwards of 20 years.

A new saddle has been invented in Philadelphia, upon which a person may ride horseback with as much ease as though he was seated upon a spring seat sofa.

A Cincinnati Artist is painting a splendid banner to be presented to the German State that first declares for a Republic.

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For the Scientific American.

Reaction Water Wheels.

Mr. Editor :—I have noticed several articles in your paper relative to Reaction Water Wheels. As this wheel is so universally applicable and extensively used in the Western country, the subject is of vast importence and is susceptible of an extensive discussion, which the public have a right to demand, not only to enable them to discriminate between the good and bad of the extensive variety which are being vended as new improvements, but to protect those who desire to use such wheels, from impositions which are of daily occurrence, and the result of patentees' conflicting claims.

For the purpose of throwing some light on the subject I will suggest some objections to the arguments of Mr. E. Bishop, in his communication published in your papers of the 18th and 26th of February 1848 and designed to overturn a report of the Committee on Science of the Franklin Institute, in answer to some queries by Z. Parker, of Ohio, published in your paper of the 27th Nov. 1847.

I must differ with Mr B. in the project of his arguments, which if I correctly understand them will not fully enlighten the public. From an experience of many years, as a practical millwright and machinist I am satisfied, the definition given to the term Reaction Wheel by said committee is clearly correct, and establishes the fact which appears to have been sought by Mr. Parker, that is, that the Reaction Wheel so called, is a " Reaction Wheel," although it may assume an hundred variations in its peculiar form and as many names as the cupidity of inventors may suggest and the fact that a mere alteration of form cannot take it out of the definition.

Fournyron of France calls his invention a " Turbine Wheel." Mr. B. also speaks of this as a Turbine wheel, conveying the impression that it is not a reaction wheel, but this wheel is propelled by a pressure in the direction of the circular motion of the wheel, developed by the discharge in a contrary direction. This turbine is as clearly a reaction wheel as any in existence. The same may be said of the spiral vent, the mitre vent, and the centre vent and a host of others of similm character.

I have noticed a paragraph in your paper which states that 26 patents have been granted by the United States for reaction wheels.—Now it is probable there has as many more patents been granted for wheels bearing other cognomens, which are wholly or in part reaction wheels. There are also a great variety of reaction wheels in use for which there has been no patent at all. In a recent travelling excursion in northern Illinois, I saw with my own eyes within as many days, forty three different models of the reaction wheel, a majority of these were not patented wheels I have also seen a great many varieties not included in the above forty three, and in all of these I have failed to discover any real improvement to the first patent taken out in the United States for a reaction wheel.

It has been a matter of much surprise to me, that in the vast varieties of this wheel there could be found sufficient novelty to justify the granting of a patent, as that novelty exists only in some peculiarity in the form without the least aid from utility. Patents which embrace nothing new or useful are obnoxious to the good order of society, particularly to those who purchase a wheel or other machinery which they have no right to use until different patentees' claims have been satisfied. A radical change should be made in our patent laws, granting patents for real improvements and not for mere alterations; such a change is necessary to protect the public from imposition

Mr Bishop says " It is the case with every wheel now in use worth using, that the water is conducted by spouts or *scrolls* so as to impinge or press against inclined planes or angles whose bases are the radius of the wheel, with a velocity acquired by the head above, and is thus made to move the wheel forward." Now it is true that the principle of applying water by spouts or *scrolls*, producing a circular motion of the water into reaction wheels and by this means combining *percussion with reaction* power has become universal, and is used by the patentees of all recent patents for reaction water wheels, and it is by this principle alone that they derive any advantage over the old reaction wheel. Mr. Bishop may not be aware by whom this valuable principle was invented, or that a patent exists which secures to the inventor the exclusive right to its use. There cannot be any valid consideration in Mr. B.'s argument until this principle shall have become public property. Any wheel which would be a reaction wheel, when applied in the old way of placing the wheel under an aperture in the floor of the penstock and the water applied by supplying a square open penstock above the wheel, must be considered a reaction wheel, at least until the public become possessed of the right to combine percussion with its reaction power.

(*To be concluded.*)

For the Scientific American.

Giants.

Some have an opinion that the race of man has degenerated in size and that the work of degeneration is still going on gradually from generation to generation. All barbarous nations have this belief. It is handed down to us in the songs and tales of old and not a few believe it now. The Scriptures make mention of Giants—" the sons of Anak," and " the mighty men of old." Both Homer and Ossian embellish their poems with the terrible size, appearance and strength of giants, but there can be no doubt that they did so to elevate their heroes who vanquished huge warriors as " tall as a pine," in personal conflict.—There can be no doubt too that in the ancient mode of warfare, that strong men had every advantage over those of less size and strength and therefore it is to be expected that they were always more conspicuous, hence the frequent allusion in heroic poetry to men of great strength—giants. It is our opinion, however, that there are just as many giants in the present day in the world as there were at any other age. If from the creation—or the fall of man—our race had been steadily degenerating in size, there would no men be found over five feet high at the present day. Any person who has seen an Egyptian mummy knows full well that a race of men who lived and were distinguished three thousand years ago, were not so powerful either in bone or muscle as the Anglo Saxon, neither were they so tall.—There can be no doubt but that strong, healthy parents will beget strong, healthy children, but we have sometimes seen the reverse, although the reverse was the exception to the constitutional law. And in regard to the Giants of olden time, they were the exception, not the rule of common generation. We do not believe all the old accounts of giants and the huge skeletons of men dug up here and there in various parts of the world. We have seen an account of two skeletons dug up in Sicily, one in 1516 and the other in 1548.—The one was thirty feet long with a head the size of a hogshead and each tooth weighing nearly half a pound. The other skeleton was thirty three feet long. In all likelihood these skeletons were those of animals of a species unknown to the Sicilians and they invested them with the pomp of a *deceased giant.*—We have seen two cases of the same kind dispelled, most disagreeably too, by a naturalist. In a rural district, parts of two skeletons had for a great number of years been looked upon as the frame work of mighty ancient men A friend of ours journeyed thither one day and discovered some of the bones of an antideluvian elephant.

In the last number of the Scientific American there was an account of a Mr. Hales of England, who is represented to be more than eight feet high We have no doubt there are hundreds of men in the world at the present moment of more than seven feet in height.—Yet it is no advantage to any man to be tall, in fact it is rather a detriment. We have never seen a man that weighed more than 300 pounds equal in strength to two men of 150 pounds each. Five feet nine inches is the best height for a man and we generally find that men of this height, if they labor at a healthy and laborious occupation, are more active, stronger and hardier than men of any other size, either above or below this measure. The writer of this has paid considerable attention to the subject and his own stature is very far from giving a biassed opinion, but he believes after much study and observation on this subject, that the last age of the world will find men " in stature and in soul as large" as was our first progenitor. G. R.

New York. May 3, 1848.

For the Scientific American.

The Atmosphere.

The atmosphere is an ambient mantle which wraps the earth in its soft embrace. Its direct height from the surface of the earth is calculated to be fifty miles, or the 166 proportional altitude to the diameter of the earth. The weight of the whole atmosphere which surrounds the earth, has been calculated by some one fond of curious comparisons, to be equal to a solid globe of lead sixty miles in diameter. The air can be weighed as well as solids and likewise measured. It is essential to the life of man, animals and vegetables. Without air no creature could breathe. Air is every where present upon the globe and bears upon every part of its surface with an enormous pressure. Every square inch of the human body continually supports a pressure of 15 lbs. A great number can scarcely credit this, as every step we take must displace an equal weight as that supported by our bodies. But we can scarcely say we support this weight, as we are supported by it ourselves equally on all sides, and we move through it as easily as the dolphin glides through the waters of the deep. Each gallon of air weighs about a quarter of an ounce.

Air is capable of being contracted or expanded in bulk both mechanically and chemically. It can be condensed by pressure and expanded by heat, and its latter quality is just beginning to be developed as a powerful propelling agent in the Air Engine. Although the atmosphere is such a beautiful and transparent substanoe, yet it is not a simple substance It is composed of two gases perfectly opposite in their natures singly. The one gas is named oxygen and the other nitrogen. The oxygen is positive in all its qualities, the nitrogen is negative. The heating and cooling of the atmosphere will not affect the quality of the air, but combustion will. Combustion withdraws the oxygen from the atmosphere and carbonic acid gas is liberated. The oxygen alone supports flame, the nitrogen is a non-supporter. The atmosphere is composed of 79 parts nitrogen and 21 parts oxygen, and although many gases have been discovered and combined, yet no other combination and no single gas will sustain life for any length of time but the air, and bountiful is our Creator who has supplied our earth with such a quantity of it.

The act of respiration is curious. By it a decomposition of the atmosphere is effected as thorough as by the most trying process. The human frame is like a great furnace, and the lungs the bellows which feed the fire. The great difference between the comparison is that the human frame is in the interior of the bellows. A man breathing consumes six hundred and forty pints of oxygen gas in twelve hours making fourteen thousand four hundred inspirations, and during the short time that elapses between an inspiration and an expiralion the air is totally changed in its character —the oxygen is abstracted and united with the carbon and carbonic acid gas is formed and this is expelled from the lungs with the unalbered nitrogen. The air that is expelled from the lungs will not support flame. If we take a glass vessel with a tube fitted exactly to its top or bottom and in inspire and expire a few times by the tube, it will be found that a lighted taper introduced into the vessel will be immediately extinguished. This simple fact should arrest the attention of those who desire to see health attending the laboring classes. Well ventillated apartments are just as essential to health as food and drink.

There is one mysterious view which we may take of this subject, viz. the renovation of the air after being breathed by myriads of animated beings who are continually consuming its vital principle. The plan which the Almighty has designed for this purpose (renovation) is unknown to man. We behold harmony and beauty in the whole system of the adaptation of man to the atmosphere and the atmosphere to man, and in the language of Holy Writ " it is very good."

Centre of Gravity.

The centre of gravity of a body, is that point, which if sustained, the body remains at rest; the particles of which it is composed being equipoised, and having their weights collected, as it were, into that point.

Bodies are reciprocal to each other as their distances from the centre of gravity. Suppose a rod 11 inches long, with a weight of 2 lbs. hung at the one end, and a weight of 20 lbs. hung at the other end, the centre of gravity, or the point on which this rod so loaded, will balance itself, is just 1 inch from the greater weight, and 10 inches from the less, because, 20 X 1 equals 20, and 2 X 10 equals 20; therefore their weights are inversely as their distances from the centre of gravity.—Hence, the method to find the common centre of gravity of any number of bodies, is, first find the centre between two bodies, then the centre between that centre and a third body, and so on for a fourth, fifth, &c.; the last centre found being the common centre of all the bodies.

From the foregoing it will easily be conceived, that if a homogeneous beam is balanced upon a point, that point will be the centre of gravity, and also the centre of the beam; but suppose the beam 10 feet long, each foot weighing 8 lbs, and a weight of 90 lbs. suspended from the one end, at what point of the beam will the centre of gravity be ?

10 feet, length of beam.—8 lbs. each foot in length. 90 lbs. weight suspended.

$$\frac{8 \times 10 + 2 \times 90}{8 \times 10 + 90} \times \frac{10}{2} = \frac{260}{170} \times 5 = 7.65$$

+2.35 = 10 feet length of beam,—that is, the centre of gravity is 2.35 feet from the end at which the weight of 90 lbs. is suspended, and will be 7.65 feet from the other end.

Suppose another homogeneous beam, 12 feet long, with a weight of 100 lbs. fixed at one end, it is found that the whole is in equilibrio, when the beam is suspended 2 feet from the end next the weight; what is the weight of the beam?

100 lbs. weight suspended.

2 feet distance from the weight.

10 feet distance from the other end.

$$\frac{2 \times 100 \times 2}{100 - 4} = \frac{400}{96} = 4.166 \text{ lbs.}$$

the weight of 1 foot of beam, and 4.166 X 12= 49.992 lbs., the weight of the beam.

It is well known to every practical Mechanic, that there are no homogeneous beams or bars:—that it is impossible to find the weight of a foot of length, in a piece of wood, iron, stone, &c., and that the exact centre of gravity of such materials cannot be found by any known theorem. To obviate this difficulty, and ascertain the true centre of gravity, the beams, bars, &c. are balanced over a prop; but there are many large unwieldly bodies that cannot be thus treated, and for this reason the following data are given, which ascertain nearly the centre required; the data being taken, which are nearest the form and distribution of weight over the body, of which the centre of gravity is required.

1. The centre of gravity of a triangle is in the straight line, drawn from any angle to the bisection of the opposite side, at the distance of two-thirds of that line from the angle.

This rule is also true with regard to a pyramid of any number of sides; also to a cone.

2. The centre of gravity of a segment of a circle, is in the radius which bisects it; and its distance from the centre of the circle, is one-twelfth of the cube of its cord divided by the area of the segment.

3. The centre of gravity of a sector of a circle is in the radius which bisects it; and its distance from the centre of the circle, is a fourth proportional to the arc, its chord, and two-thirds of the radius.

The Journeyman mechanics of Philadelphia have formed an American Fraternization and Copartnership Association, the object of which seems to be the abolition of silver and gold currency, and the introduction of the African and Asiatic system of barter.

A French surgeon has discovered that the bark of *Andansonia digi ata* is more efficacious for fevers than *quinine.*

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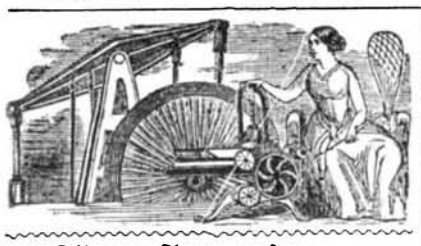


New Inventions.

New Sewing Machine.

There has been exhibiting for a few days past in the Merchants' Exchange in this city, a complete Yankee invention of a Sewing Machine, invented by Messrs. J. B. Johnson and Charles Morey, of Boston. The machine is very neat and portable—one that can sew as fast as six seamstresses might be carried in the inside of a common hat. Without a drawing, (we may be able to give one at some future period,) we cannot convey a correct idea of its mechanical construction, but we will endeavor to explain its principle. The machine is a small box with an axle passing through the middle of it. This axle is turned by a small wheel or crank and drives all the machinery, which is very simple. There is a traversing bar which carries the seam to be sewed gradually forward to be punctured by a needle passing through a small orifice of the box into the inside. This needle has an eye near its point which carries the thread through the cloth and orifice to the inside of the box where it is caught by a traversing fine hook which catches, and lets go, loop after loop, hooking the one loop over the other along the whole seam like the loop and stitch operation, so well known in knitting. In fact it is the principle of chain knitting applied by machinery to sew garments. The thread is supplied to the needle from a spool and it need not be threaded during the sewing of a thousand yards of cloth. The machinery to carry out this principle of sewing must be exceedingly correct, not a loop must be missed in a seam by the needle or hook.

The invention and machine does great creeit to the inventors, as a screw cam on the axle spoken of moves all the machinery—the needle carrying the thread and piercing, the hook catching, and the seam bar by its rack traversing, each correctly in its proper place and at its proper time of operation.

Messrs. Johnson and Dyer, the proprietors for this State, exhibited this machine to us, and we saw it operate successfully at the rate of 500 stitches per minute.

New Guage Cock.

Mr. John Adams, a practical mechanic, in the employ of the Auburn and Rochester Railroad Co., has invented a new Guage Cock for boilers, which is represented to answer the purpose of three such as are in common use. It has been commended by some engineers, who we know are well able to judge of its merits. Measures nave been taken to secure a patent.

New Railroad Brake.

Mr. W. O. Stone, of Charlestown, Mass., has invented a new Railroad Brake, for which we are informed he has taken measures to secure a patent. Mr. Stone we learn has offered the use of his Brake to one of the Eastern railroads for the purpose of its introduction.—We have seen a model of the invention, and models have been sent to various Railroad offices for a thorough investigation of its merits. Many who have seen the model have highly commended it.

A New Signal.

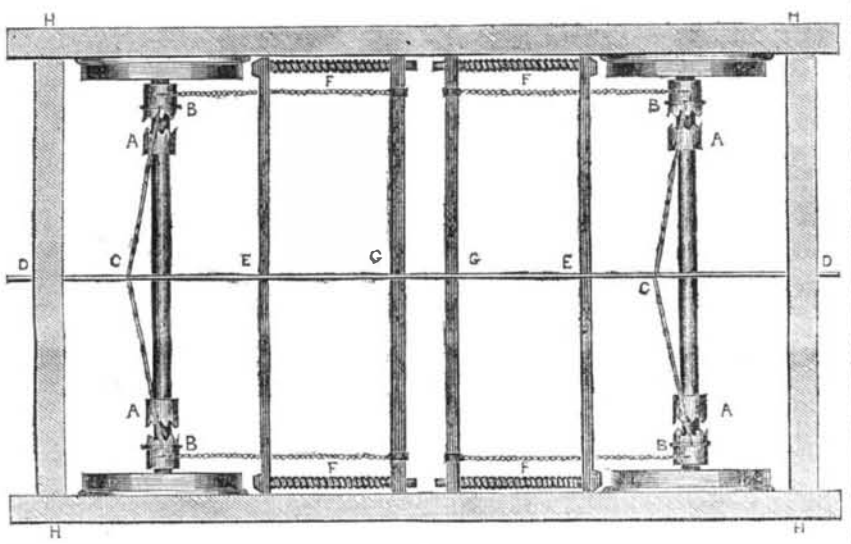
Mr. Henry Sands, of Louisville, Ky., has invented a new Signal Lantern, for which he has applied for a patent, and which promises to be an exceedingly useful article, especially for vessels navigating the Mississippi, so as to prevent collisions—evils which so often occur on our Western waters A large lantern is placed in front of each funnel of the steamboat exhibiting a light in each. If two boats be meeting each other, the pilot changes the single light, by pulling a cord, to four lights of different colors to show what course each must take. These colored glass signals are to be understood by the pilots so that the ascending and descending boat will take each its right course, and as soon as the boats have passed, the colored lights are moved back.

New Brick Machine.

By our valuable exchange, the Hamilton, C. W. Gazette, we learnthat a Mr. Butler of Toronto, has recently patented a Brick Machine in Canada, and is about making application for a patent in the United States and England — The construction of the machine appears simple, although it does not appear to do so much work as some of our machines here, such as Grant's, Adams's and others, yet its work may be very superior. The machine is of a square form, and the length of the sides is four feet six inches. Its appearance is that of a large box. In the centre of the machine is a perpendicular shaft, to which is attached four knives, of equal length from the centre, making eight points or blades between two and three feet in length. These grind and prepare the clay, which is thrown in at the top of the machine. The clay moves to the bottom partly by its own weight, and partly by the peculiar form of the knives. An apparatus for pressing the clay into the moulds, is placed underneath the knives, with which it revolves, being also attached to the perpendicular shaft. In the bottom of the machine are two cast iron plates, placed at opposite sides, and in each of these there are five holes in the shape of the moulds which are placed under the frame of the machine. Through these holes the clay is pressed into the moulds. Both sets of moulds are filled every time a revolution is made by the knives and the instrument that presses the clay into them. The machine is worked by means of a forty foot lever attached to the top of the shaft. The moulds are put in at the side of the machine, and they press one another out at opposite sides and at right angles to the side at which they are put in. Alternately, one set being filled, and brought out by each half circle of the horse. A man stands at each side to receive them, who empties the moulds and reaches them to the person who puts them in, while two other men, one at each side of the machine. carry the bricks away. It requires two men to put the clay into the machine, and a boy to drive. Seven men and a boy are the compliment of hands required to work the machine efficiently. The horse will make about two revolutions in a minute, producing 20 bricks in that time, 1200 an hour, and 14,400 in a day of twelve hours. The inventor is of opinion that they will be able to make from 15,000, to 20,000 a day. Seven men would mould by hand, about half the former quantity of bricks of equal quality, and it would require at least seven boys to run them off.

It is very evident that with more power, it can double the amount of bricks stated above, yet this would be less than Adams's machine described in number 18, of this vol. Scientific American.

IMPROVED RAILWAY BRAKE.

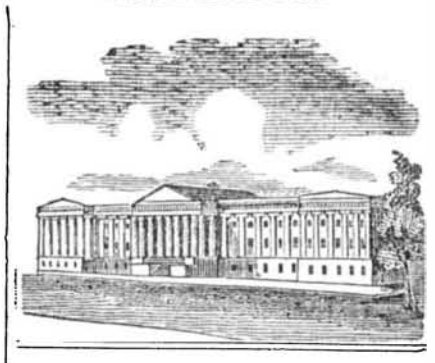


The above is a representation of an improved Railway Brake, the novelty of which consists in its causing the cars, by the mere push of a lever instantly *to check themselves*, without being dependent upon the main force of the brakeman to effect the same. The plan is very simple and effectual H H, is the common truck frame resting upon the end of the axles. The axles revolve with the wheels as usual. A A, are halves of the clutches placed near each wheel. These halves are either made with the axles or firmly fastened upon them afterwards. B B, are the other halves of the clutches and are made to slip upon the axles. E E, are the rubbers which are connected by the springs F F, to the cross-bars G G. C C, are levers fastened at one end to slipping rings which are fitted in a groove in the clutch halves, and at the other ends to the long rod D D, which passes the whole length of the truck. This rod is moved back and forth by upright bars placed on the platforms of each car, as in the common manner.

When a car is in motion and it is desired to stop, the brakeman throws forward the rod D D, which causes the levers C C, to bring up and join the clutch halves B B with A A. The clutches being joined, the chains are of course instantly wound up, drawing with them the bars G G, and pressing the rubbers E E, by means of the springs F F, with tremendous force against the wheels. This force constantly increases until the wheels are so firmly blocked that they cannot turn. The wheels are released by throwing back the rod D D, which operates the clutches, and the springs F F, fly back. The springs are intended to counteract the sudden jerk with which the brake would otherwise act. The rod D D, passes the whole length of the car operating both brakes at the same moment. It can easily be arranged to operate them separately, or, the rods of a whole train can be connected and made to work together and the cars be thus instantly stopped by the engineer. This brake is the most effectual of any we have seen and will prove of great importance provided the parts can be made sufficiently strong. It only remains to be well tested on some of our large cars. The inventor is about trying it on the Long Island or some other railroad and we shall then lay the result of the experiments before our readers. Measures are in progress to secure patents in this country and Europe. Any further information may be obtained at this office.

New Determination of the Sun's Distance from the Earth.

It appears from the report of the Committee on Naval Affairs, made to Congress on the 13th ultimo, that an effort is now making for a new determination of this very important element of all our tables of astronomy and navigation. Two methods, it seems, have been already tried. A third method suggested by Dr. Gerling, a distinguished German astronomer, remains as yet untried. The committee recommend a small appropriation for the purpose of making observations at some of our Southern Naval Stations, in connection with the observations of the Northern hemisphere. The object is to test the correctness of the former measures of the sun's distance, and to make the measure anew. The reputation acquired by our Rittenhouse in his labors on this subject, in the last century, are alluded to in the report. An enterprise of such immediate importance to the interests of commerce and navigation, we hope will meet with the approbation of members of Congress from all parts of the Union.



LIST OF PATENTS

ISSUED FROM THE UNITED STATES PATENT OFFICE,

For the week ending April 25, 1848.

To Frederick C. Smith, of Harper's Ferry, Va., for improvement in Ploughs. Patented April 25, 1848.

To Stephen Holmes, 2d., of Kingston, Mass. for improvement in Ship's Windlasses. Patented April 25, 1848.

To Joshua Graves and William L. Gordon, of Bridgewater, Mass., for improvement in casting Rolls. Patented April 25, 1848.

To Samuel Hall, of Pittsburgh, Penn , for improvement in Ploughs. Patented April 25, 1848.

To Faulkner J. Norton, of Lower Sandusky, Ohio, for improvement in Horse Powers. Patented April 25, 1848.

To Asa Whitney, of Philadelphia, Penn., for improvement in annealing and cooling cast iron Car Wheels. Patented April 25, 1848.

To Gustavus A. Nicoles, of Reading, Penn. for improvement in Locomotives. Patented April 25, 1848.

To A. P. Norton, of Pittsburg, Penn., for improvement in Mills for crushing and grinding. Patented April 25, 1848.

To C. H. Brand, of Williamsburgh, N. Y., for improvement in manufacture of Velluted Cloth. Patented April 25, 1848.

To Joseph G. Isham, of New York City, for improvement in Sand Paper. Patented April 25, 1848.

To Charles Goodyear, of New Haven, Conn. for improvement in making hollow articles of India Rubber. Patented April 25, 1848.

To Charles D. Wright, of East Haddam, Conn., for improvement in Tail Blocks of Saw Mills. Patented April 25, 1848.

To Patrick Connelly, of Cincinnati, Ohio, for improvement in Spark Arresters. Patented April 25, 1848.

To Charles F. Durant, of Jersey City, N. J. for improvement in dissolving and softening Gutta Percha and Caoutchouc. Patented April 25, 1848. Ante-dated Oct. 25, 1847.

To William B. Hill, of Grand Rapids, Michigan, for improvement in Balance Valves for Steam Engines. Patented April 25, 1848.

INVENTOR'S CLAIMS.

Husk Mattressess.

By Adrian Olcott, of Newark, N. J. Improvement in machinery for preparing husks for Mattresses. Patented 20th Nov. 1847.—Claim.—What I claim as my invention and desire to secure by letters patent, is the combination of the machinery by which the husks are knobbed as herein described, and also the combination of the machinery by which the husks are slit and cleaned as described.

Mills.

By Edward Harrison, of New York. Improvement in Mills for Grinding. Patented 20th Nov. 1847. Claim.—Now what I claim as my invention and desire to secure by letters patent, is the combination of the Fan-drum, with the stationary grinder and casing in a manner substantially as herein described, to cool the grain.

Bog Cutters.

By Robert Cummings, of Lima, Ind. Improvement in Bog Cutters. Patented 20th Nov. 1847. Claim.—What I claim as my invention and desire to secure by letters patent is the combination of the angular knives and revolving knives in the manner described. I also claim the hooks constructed and operating as described. And I claim lastly the combination of the roller with the hooks and knives.

Of all bodies steel is the strongest. It requires a force of 115,000 lbs. to tear asunder a steel rod the area of which is one inch.

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NEW YORK, MAY 6, 1848.

Bain's Electro Chemical Telegraph.

Mr. Alexander Bain, the celebrated inventor of the Electric Clock, and many other inventions, has just paid a flying visit to this country to secure by patent his invention of the Electro Chemical Telegraph. He has been exhibiting his invention for a few days past in this city, and by invitation we examined his apparatus and received a full explanation of the whole operation, both theoretically and practically from the inventor himself.

The Electro Magnetic Telegraph as first contrived and now used in Europe and America is dependent, (as the name implies,) on Magnetism to move metallic bodies for the purpose of giving and recording signs, and as early as 1837 a Mr. Davy published in England a mode of using the electric current to mark signs on cloth by chemical means, but his apparatus was only capable of giving about six signs a minute in a short distance by several wires at one point.

By the invention of Mr. Bain he dispenses with the magnetic action to produce mechanical movements for making and recording of signs, and employs long strips of paper so perforated in groups that each group represents some known letter or sign. The non-conducting substance of the paper passing *between* the electrosed parts of the machine intercepts the electric circuit except at each perforation where the electrosed parts of the machine come in contact through each successive perforation, this admits the electric current to act with its natural velocity to complete the circuit and transmit the sign to a distant station where each sign is recorded by the electric pulsation passing into and through a chemically prepared paper made to revolve on a cylinder that travels at a like speed per minute as the perforated paper at the transmitting station. In this manner no time is lost by any mechanical movements or magnetic action or by any manipulation of the operator at the machine and by multiplying the parts through which the perforated paper passes giving each part a separate battery and a wire to each line of telegraph, the same communication is fully and simultaneously transmitted to and recorded at any reasonable multiplicity of distant stations, or if a machine consisting of twenty such parts is required to send to one, two or three distant stations only, all those parts not wanted are put out of action by simply turning back the parts that complete the electric circuit. In this manner Mr. Bain has transmitted signs representing one thousand letters (not words as has been erroneously supposed,) per minute; and at the average of 3½ letters to a word, this will be about 285 words per minute, but it is believed by Mr. Bain that he will be able shortly to transmit 3500 signs equal to 1000 words a minute, though he does not wish to assert that he has transmitted so large a number. No part of the machinery is liable to derangement, except the conducting wires, this is common to every other arrangement at present in use, though the time may not be far distant when this last inconvenience may be avoided. By this mode of operation the public news of Europe or of the United States, may be composed in either country or on the passage between, so that on the arrival of the steamer the composed news may be at once placed in the Electric Telegraph, and in a few minutes be transmitted to every important place in the country, for the Press to be copying it for the public information in places hundreds and even thousands of miles apart, within one hour of the same time at which it arrives; or a merchant having correspondence at a distant city can use his own mode as agreed between himself and his correpondent of signifying letters by perforations, and in transmitting a notice by thismeans, be secure against any one else knowing the business it concerns, because the paper containing the received and recorded notice going to the correspondent would only be understood by him and the party who sent it. And from the rapid action of this mode one wire will trans mit more than fifteen wires can do now, as so many communications can be successively sent in the same time now occupied for one. This mode is in use between London and Birmingham, a distance of 112 miles, and between Manchester and Liverpool, a distance of 32 miles. It has been PROVED from London to Liverpool, a distance of 226 miles, under an unfavorable state of the tunnels through which the connection of the wires passed, but the result was the same, and when Mr. Bain left England the London and Liverpool line was in course of completion throughout.

We shall be able to present our readers with a fine view of Mr. Bain's Telegraph, with description as to its operation, &c. in a few weeks.

Science and Labor.

There are many who suppose that scientific acquirements and a laborious occupation, are incompatible things. There never was a greater mistake. If there is a single fact more strong than another to strengthen our proposition, it is that of our great New England Blacksmith, Elihu Burritt, charming and rivetting the attention of wondering listeners in the vast metropolis of the British empire. Workingmen, just reflect for a moment upon the career of our blacksmith hero. A short time ago we beheld him, the son of a widow, laboring at his anvil for his daily bread. Now we behold him standing before princes, the noblest prince of them all—a prince of good works, noble thoughts, and a prince in eloquence and knowledge. How did Elihu attain to his present eminence? By the employment of his spare moments from hard labor in acquiring useful knowledge. There are many mechanics and laboring men who may not have the advantages of Elihu Burrit, and many more have not his capacity, but there is not a single individual who makes the best use of all his privileges, a fact which too many have to regret when the circumstances of age or worldly cares place such opportunities forever out of their reach. We speak now to young artisans and mechanics. We would sincerely call your attention to the acquirement of what is useful when you are young. Remember that knowledge is never a burden to carry along with you wherever you go, but is rather a letter of introduction to the society of the sensible and the truly respectable in every land, while it is in a thousand ways serviceable in the pursuits of life. Farquharson who purchased Fontonwell Abbey, was indebted for his wealth to but a very slight knowledge of chemistry, acquired independant of his profession. Ignorance on the other hand, is continually placing barriers in the pathway of man's advancement — We do not mean by "knowledge" that it should be acquired for the purpose of making money. Such an idea is degradatory to the character of man. Workingmen, for we are now speaking to you, should acquire useful knowledge for the very pleasure that is inherent in the acquirement of it, and for the object of being better men and better citizens. There is no way by which the working people will ever be elevated to a higher position in society, than by sound knowledge—"knowledge is power." When men intelligently understand themselves—their own rights and the equal rights of others, then they will exert an influence at once healthy and beneficial both for their own benefit and the benefit of society. This kind of spirit is now being developed and these opinions are now being extended among the working classes throughout many parts of the world. With a calm and solid judgment they perceive that virtue, common sense, correct information, and calm and liberal views are the only true guides for the elevation of any class of men, and certainly these views and these acquirements are not incompatible with Labor.

The Pensacola Gazette describes the Arcadia Cotton Factory, near Pensacola, which is now in succeessful operatian It is worked entirely by slave labor, runs 25 looms, and turns out one thousand yards of cotton per day.

Economy of Power in Cotton Factories.

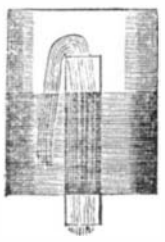
(*Continued from our last.*)

Considerable difference of opinion exists respecting the best *bush* metal for shafts to turn upon, aud though of the first importance there is no point connected with the construction of machinery so scantily furnished with *satisfactory* experimental data.

James Ferguson, and other scientific men, having investigated this subject, recommend the metal composed of the most minute particles.

As friction results *principally* from inequalities on the surface of bodies coming in contact with each other, they very plausibly conclude (and experiments upon a small scale without the use of any lubricating substance seems to bear them out,) that fine grained metals presenting fewer inequalities on their surface cause less friction. This theory, however, does not seem to stand the test of experience on a large scale; indeed the whole subject of *friction* is involved in mystery.—All writers that I have consulted with the view of obtaining definite ideas respecting it, either express themselves with extreme caution, or deal in vague generalities. Cast iron properly hardened, has answered a better purpose for shaft bearings than any thing I have ever used. If it is well oiled the first month of its being used, a fine skin enamel is formed on its surface, which with the same quantity and quality of lubricating matter, will allow *large* shafting to revolve more freely than the finest brass or composition in common use. If, however, from neglect it is allowed to run dry until the metal wears, it is more apt to do so again, hence no agent of a cotton factory should leave the entire care of the shafting in subordinate hands during the first month *at least* of its operation. Ofcourse we would not recommend the agent to apply the lubricating matter himself, but we *do not* think it would derogate from the dignity of his station, or *permanently* injure his fingers to apply them occasionally to the bearings to satisfy himself that they do not "heat." This may be reckoned among the "meaner things" that ought to be left "to low ambition," but we consider no man capable of starting up a new mill with profit to the owners, (in a place where manufactories are not already in successful operation) who is not willing to attend personally to every minutia until a proper system is established, and overseers, whose integrity and ability may be implicitly relied upon, are put in charge of the several departments.

Should any bearing wear so much as to prevent the shaft running true, it ought to be replaced by a new one at once,—if however, the surface is merely worn rough, its polish may be restored by applying brimstone mixed with oil, a few days while the shaft is in operation. When the oil is used for lubrication the best sperm the market affords is the most economical to use in a cotton mill. For shafting not over three inches in diameter, nor revolving more than 120 turns per minute, it answers well, for safety and economy, to have a hole about an inch square in the cap directly over the bearing, and kept constantly supplied with common tallow which being always in contact with the revolving shaft, it needs no other lubrication, unless the tallow is unusually hard, then a few drops of lubricating oil may be poured upon it once a week. As there is more danger to be apprehended from *large* shafting heating in the bearings the Lubricator should always be applied.—



THE LUBRICATOR.

This consists of a tin cup, capable of holding about a pint of oil, with a small tube passing through the bottom and reaching nearly to the top inside. It should be placed so that the lower end of the tube will point to the centre of the bearing; if the cup is filled with oil and supplied with a wick, one end of which resting in the oil and the other passing down through the tube to the bearing, capillary attraction (the same principle that supplies combustion in the common lamp) will cause a constant dripping of oil from the wick, proportioned to its length and size. Any contrivance to raise the wick from the oil, or press upon it at the top of the tube will stop its capillary action when the shaft is not in operation.—The Lubricator should be applied to every bearing liable to heat from excessive friction.

W. MONTGOMERY.

(*To be continued.*)

American Carriages.

Two handsome omnibusses have arrived in Philadelphia from Troy, N. Y., of which the Ledger speaks in terms of the highest praise. The one is called General Taylor and the other Eclipse. They are said to exhibit a high degree of workmanship. The painting is beautifully done and the ornamental gilding and scroll work which the sides of each present, as well as the lettering, is of the most beautiful description. The interior of the coaches is furnished with crimson velvet cushions, of very superior make, while the sides are embellished with strips of highly polished mahogany Each coach has been provided with a burning fluid lamp in front, to which has been added an improvement, consisting of tubes to carry off the smoke. Such specimens of mechanical skill exhibits the great perfection which the artisans of our country have reached in the manufacture of conveyances for the ease and convenience of the public. A number of very elegant light carriages were shipped from this city to London last Fall and met with high commendation and a ready sale.

Cotton Raising and Cotton Spinning.

A correspondent writing to the Alabama Planter, says:—

"Cotton raising is a rather uncertain and unprofitable calling. It is a little like gold digging, delusive: yet I do not know what else to engage in, unless I build a factory. I have water power near at hand sufficient to drive one or two thousand spindles. From what I can learn, manufacturing cotton is far more profitable than raising it. In fact, if a house with which I have correspondence, makes correct statements, a factory costing 15 to 20,000 dollars would pay for itself in twelve or eighteen months. If you can send me a partner with funds, I should be tempted to try the experiment."

Herman Steamer, at Halifax.

When the Herman put into Halifax, she was visited by Sir John Harvey, the Gov'r., accompanied by lady Harvey, the provincial Secretary, and a number of army officers. The boom of a gun saluted his Excellency on boarding her, and the vessel in honor of the occasion, was decorated with gay flags. Sir John was most graciously received, and after examining the different departments of the steamer, partook of a Luncheon in the saloon. On leaving, he was pleased to express the entire satisfaction and extreme pleasure he received from his visit

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Sugar Cane and Sugar.

The planting is performed about the end of February, by laying the cane lengthwise. The sprouts are ploughed in March, May and June. The cutting of the cane for seed is commenced in October, and for grinding in November. It is brought into a shed, where the cane-carrier is situated, which leads to two iron rollers, driven by steam. The juice runs from thence into a reservoir, or boxes. The cane after being hard pressed, called the *begasse*, falls from the rollers into a large chimney, and is burnt to ashes. The juice now called *la plobe*, is put into the first kettle, holding from thirty to forty gallons, and boiled, with the addition of a small piece lime, in order to neutralize any excess of acid. When sufficiently concentrated, it is brought into the second kettle, called the *flambeau*, and added to a previous quantity of juice, where it is likewise boiled down for a short time, and from thence into the third kettle, and is called the *syrup*. This is the material containing both molasses and sugar. It is then finished in the fourth kettle, called the *battery* and from thence thrown into coolers, where it remains for five or six hours. The sugar is now altogether crystallized, and separated from the molasses, and put into boxes and carried to the purgery, a large building, in which the hhds. are placed on pedestals, and the molasses allowed to run and drop through the sugar and hhds. on the ground, which is perfectly clean and smooth, and is then put likewise in hogsheads and barrels.

For the Scientific American,

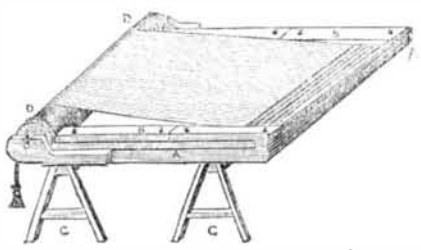
Manufacture of Tapestry, Carpets, Rugs, Copying Paintings, &c., By Cementing a Nap or Pile, on Plain Cloth.

A method of manufacturing carpets, hearth rugs, &c., has lately been discovered, which differs so much from those we have already described, and at the same time possesses so much merit, that we think our series would be incomplete without giving an account of it. This method is, indeed, so unlike the ordinary modes, of manufacturing carpets, hearth-rugs, &c., that it cannot, properly speaking, be considered under the head of any branch of weaving at all: it will, however, be interesting to both weavers and manufacturers, to have a full explanation of it, as it is likely to supersede any of their present processes.

This remarkable invention attracted much notice at the time of its first introduction, in 1838; and several machines are now in operation, upon the principle of it, in England and Belgium. We have made the annexed drawings and description from a machine, while at work in the latter country.

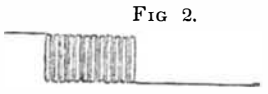
Fig. 1, represents a perspective view, of a machine suitable for carrying out the first part of the invention, *a a*, is a quadrangular frame, having the guides, *b b*, affixed by screws or other suitable means. allowing of their being readily removed to take out the goods.

Fig. 1.



The frame *a a*, is supported by the legs, or frame *c c*. On the under side of each of the guides is a groove or space between the guide and the frame *a*, the object of which will be hereafter fully explained. *d d*, is a roller, on which is warped a number of threads of worsted, wool, cotton, silk or other fibrous materials, or mixtures thereof, in like manner to beaming a warp for a loom, as if the same were to be woven into a fabric, in the ordinary way, with warp and weft, and the warp beam or roller *d d*, is weighted and has friction bands, as is practised in looms for weaving. The ends of the warp threads are made fast to the front rail of the frame *a*, in like manner to fastening a warp to the cloth roller of a loom. The workman then proceeds in the following manner: He has a number of strips of thin metal, such as copper, zinc, or other suitable materials, the strips being all of the same size; *and are to be in width what the depth of the desired nap is to be*, and of a length somewhat greater than the width of the fabric to be produced in the machine; the frame *a*, and guides *b b*, are to have a space between them equal to the width of the intended fabric to be produced. The operator first places one of the strips of metal under the warp, and drops it up to the end, and parallel with the front rail of the frame *a*, the two ends of the strip being placed under the guides *b b*, by which they are prevented rising up; he then places the next strip edgeways on the upper surface of the warp, and depresses the warp evenly between the first and second strip, and springs or bends the second strip in such a manner as to allow of the two ends thereof entering into the grooves formed between the guides *b b*, and the sides of the frame *a*. He then places another strip under the warp and raises the same up evenly between the second and third strips, and the strip in such a manner as to cause the ends to enter the grooves formed between the guides and the sides of the frame *a*, and then straightens the strip so as to lay the same parallel with the preceding ones: then he takes a fourth strip and places it on the upper surface, of the warp, and depresses the threads thereof evenly between the third and fourth strips, and causes the end of the fourth strip to enter the grooves formed between the guides *b b*, and the frame *a*, and with a straight edge presses the strips up evenly from time to time, so that they may be kept on their edges and in straight lines parallel to each other, and when the frame *a a*, is full, threads composing the warp will be so arranged between the strips of metal or other suitable material, as to pass first over, then under, each succeeding strip, as is shown in Fig. 2.

Fig 2.



The warp thus arranged should have a smooth surface of metal or other suitable material passed over and pressed on the upper side in order to lay and press the threads down evenly, and also to cause them to spread out in such a manner as to produce a touching of the fibres throughout, so that when a suitable cement shall be placed or spread thereon and dried, the whole will become one sheet of fabric when the strips are removed by cutting, as will be hereafter more fully explained. The cementing used by the inventor is India rubber, (caoutchouc;) but other materials, such as shellac, may be employed instead. One or more coats of India-rubber, or other cement is to be spread over the surface of the warp, arranged and prepared as above explained, and permitted to dry, and in this condition the frame *a a*, may be turned over, and then by a sharp knife or other suitable cutting instrument, the slips may be successively removed by cutting the yarn from side to side of the fabric, in like manner to cutting the warp when weaving velvet; but it is not necessary to have the strips grooved as is the case with the wires used in making velvet, but they may be grooved, if it is desired to be very correct in the cutting. The fabric thus prepared is then suitable to be applied to woven textures or other surfaces, by cementing it thereto, but it is preferable that the back of the woven fabric should be cemented on to the warp, immediately on the warp or pile having been heated with the cement, and before cutting out the strips of metal (as shown in Figs. 1 and 2) or other suitable material employed, and this may be performed by having first spread a layer of the cement on the warp, and another on to the fabric which is to constitute the back, and then bring the two cemented surfaces together and press them well, and if the surfaces be extensive the pressure may be conveniently performed by means of a smooth iron roller passed over the upper surface, such roller being made hollow. may be heated with an iron heater, In case it be required to make carpets or rugs, or other fabrics, with *patterns*, then it will be desirable to print the threads in the warp, but each pattern must be *so lengthened as to allow of the bending up of the threads*, and the colors used must well penetrate the warp.

Fig. 3.

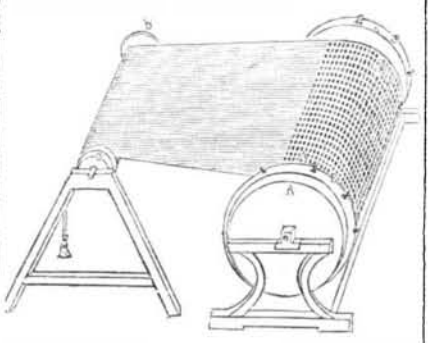
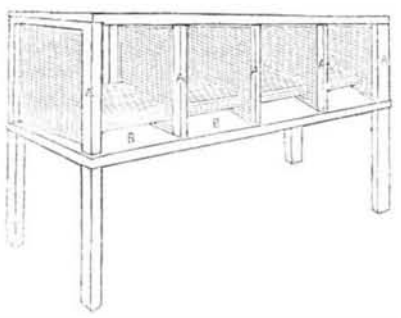


Fig. 4.

Fig. 5.



shows another arrangement of machinery for performing a like operation of bending lengths of threads or yarns to that above described; the only difference being that the frame *a* and guides *b*, are formed into a cylinder, and this machine requires that the fabric when produced should be unwound before the cutting out of the strips; in other respects the description above given, aided by the drawings will be sufficient, the same letters indicating similar parts in this machine as were used in Fig 1. And it will be seen that the cylinder *a a*, has an axis with suitable bearings at each end, in order that it may be turned round by the workman as he proceeds. Another means of performing this operation of bending a number of threads (in such manner that each portion of thread or yarn when cut shall be cemented at a point or part intermediate of its length, and the two ends thereof rise to the surface and form the warp of the fabric,) may be employed in the following manner: in place of warping the threads on a roller, as above explained, and then bending the warp over and under a series of thin strips of metal, as in Figs. 1 and 2, the strips may have thread wound spirally around them as is shown at Fig. 4, and then a number of such covered strips are to be placed side by side in a frame *a a*, and the threads cemented together and to a suitable fabric, and the strips cut therefrom as above explained. We have stated that the looped up threads were to be cemented to a cloth, which would serve as a back, yet under some circumstances it will be preferable not to perform that operation, such as in making a suitable napped fabric for the covering of hats and bonnets in which case the napped fabric being made, as above explained, in place of cementing it to any fabric, *it is to be cemented directly on to the hat or bonnet.*—Gilroy.

A Deep Pit.

A friend of ours, who keeps a boarding-house, says the pit of a certain boarder,s stomach at his house approximates nearer to the "bottomless pit," than anything he has ever seen. He never becomes satisfied, and is always hungry—is the reason he assigns for this opinion.

A mob of Journeymen brick makers was dispersed by the Baltimore police on Thursday, during an attempt to destroy some labor-saving machines introduced in certain brick-yards, under the insane pretence that with them they would dispense with hands.

Terrestrial Magnetism.

(*Concluded from our last.*)

According to Mr. Evan Hopkins, who published a work about three years since "On the Connection of Geology with Terrestrial Magnetism," magnetic currents are continually crossing from the south to the north pole through and around the earth. He shows that the southern aurora, which observation has proved to be accompanied by a similar phenomenon in the north, differs from the latter in appearance, in consequence of the greater amount of vapor produced by the preponderence of ocean in the South. The form is alike in both cases, but the light of the southern aurora is white, while in the north it inclines to red and purple. We read that "the saturated or hydrogenous nature of the currents coming from the south pole towards the north, will account for the observed peculiarity of the southern hemisphere in its general temperature, moisture, rains, the growth of vegetation, &c., as compared with that of the northern." Magnetic and galvanic currents are shown to be identical, except that the action of the latter is in some degree restricted to liquids; and as all metals may exist in solution, their deposition, by means of the currents, admits of demonstration. In this case nature accomplishes on a large scale what experimentalists achieve with the galvanic battery; and, as Mr. Hopkins explains, "If we admit the existence of subterranean currents, and that these exert a slow decomposing power, like those of the voltaic battery, we have a sufficient power for our purpose. In the first place, we have a mechanical tension on the consolidated parts of the rocks, by the linear action of the currents passing through them; and should the intensity of the currents be very great, fractures would ensue more or less at right angles to the direction of the force. These fractures would admit of air and water, and thus produce intense heat, by the avidity with which the metallic nature of the basis, of the earths and alkalies combines with the oxygen. That nearly all the substances which constitute the crust of the globe are found *in solution* as well as solid saturated throughout the rocks, and to such a degree sometimes to issue out and form springs is well known, therefore, judging from the violent effects on a small scale which we are able to produce by experiments, a heat would be engendered quite adequate to occasion all that takes place in earthquakes and volcanic eruptions."

In this way may be explained the formation of veins that have long puzzled the geologist. That it is in obedience to some law, is evident from the general direction of metalliferous and crystalline deposits being the same in different parts of the world. The oblique direction apparent in some instances arises from the force of tension acting at right angles to the lines of structure, which is northerly and southerly. The parallelisms are, in fact, most remarkable. Humboldt found the primitive rocks in which metallic veins chiefly occur, in South America following the same line as those of Germany and England; the same parrelism has also been traced between the upheaved rocks of Russia and Africa. It is assumed that the intensity of electric action increases in proportion as we descend into the earth; and there are many striking effects witnessed in mines, which the existence of electric currents disturbed by local causes will alone explain. The heat in mines, particularly those of South America, is not constant; patches which at one time are at a very high temperature, become gradually cold, without any apparent cause, and after a time resume their warmth. The growth of minerals in old workings, as a mossy excrescence, is a fact well known to miners; and in some instance, as observed in Durham, Hanover, France, and in the gold mines of America, when a vein has been worked out, and the galleries left closed, they became filled with solutions of the rocks between which they are dug, and in course of time the deposits thrown down render them again worth the working—the mineral being solid, or in a powdery form, according to the intensiiy of the current. As is well known, crystals are hardly to be obtained by fusion, but may readily be produced from

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soft and moist substances, a point admitting of experimental proof. "In order" to exhibit the mode of filling, and the formation of different crystals in the same fracture, place a mass of clay-slate between the poles of a battery, immersed in a metallic solution; it will be seen that the currents pass only in the direction of the cleavage. If the slate be broken across, so as to represent veins or fractures, crystals will be observed to grow in each fracture transversely; that is, in the direction of the cleavage planes."

TO CORRESPONDENTS.

"F. C. W. of Illinois."—We do not know of the application of the escape steam from a common to propel a rotary engine. But it could not be patented as the principle is only involved in this, and the same principle is applied to Wolfe's engines. But would it not be cheaper to use the steam expansively, having a larger cylinder to the common engine, than to use the two in combination? We think it would. Your latter plan is entirely new and ingenious. We do not know of any thing of the kind in existence You must judge of the economy, and decide whether a patent would be profitable to you or not It certainly is original.

"J M. of Pa"—We are glad to receive (Post Paid) communications, and unless we think the writer in an error as regards his invention, we make no charge for publishing it.

"H. A. of N. Y."—We have answered you to Easton Village.

"W. H. R. of West Florida."—No. 49 last volume, Sci. American, will give you a good idea of the employment of circular saws for cutting logs. Explanatory cuts accompany the description. Two three feet saws will be required to saw a log three feet in diameter. The most recent work on the mechanic improvements you speak of, is Holtzapffell's, price $10,50 cents. A good horse power will cost from 50 to 60 dollars. A good work on Grist Mills is not to be had. Scott's Millwright's Assistant is the best, and it costs 22 dollars.

"B. D. S. of Va."—It will be very easy to try your experiment on a small scale, but you may depend upon it that it will not realize the least beneficial results The pressure of water is equal upon all sides, and the resistance to be overcome must be by a momentum communicated to the machine.—No machine has power in itself but that which has life.

"J. P. of Mass."—The round rail of the bedstead is preferred for cheapness, because it is turned off very rapidly. By proper mortices in the round rail for slats, that could be taken out and put in in a few seconds, a more convenient bedstead might be made than any now in use. Iron bedsteads are fast superseding wooden ones, and yours is far superior to many in use.

"W. R. G. of N. Y."—You will have received our answer by mail, ere this time.

"S. V. of N. Y."—Use a little oxalic acid, and your iron spots will quickly diappear.

"G. R. of Pa."—Robert Fulton was a native of your own State. There is no truth in the statement that Henry Bell was employed on Fulton's first Boat. "Some books are lies from beginning to end."

"J. C. of Boston."—We have received yours and will proceed with all despatch in the business. Your paper has been regularly sent.

"S. M. of R. I."—Put on a stronger spring to your cutter, and we warrant you a correct operation.

"J. W. G. of Pa."—The meaning of a specification is, that others may be taught to do the same thing and to distinguish the invention from others. There must be no false description, or the patent is void. The great fault with inventors is, that they wish to cover too much.

"J. B. of Ohio."—In the Patent list received from the Patent Office Mr. Blage of Sharon, Ohio, was the name for the invention of artificial slates.

"W. L. of Ohio"—You did not pay your postage, so we cannot give you the information you desire. Unpaid letters receive no attention at this office.

"A. T. of R. I"—Your method of preserving coffins is new and could be patented. It might prove valuable—but give it a good trial first. Send us a drawing of your "Bevel Try-square," as we do not exactly understand it.

"R. B. of N. Y."—We cannot procure for you a work devoted exclusively to Tracing Minerals, but can furnish you with various kinds of books on Mineralogy.

"W. S. B. & J. N. of N. Y."—Your money was duly received at this office, but by mistake your names were entered under Newark, Ohio. All right now.

St. Louis Saturday Evening Post.

It is impossible for us to do justice to all our valuable exchanges in the way of noticing but when one comes to us that is exceedingly meritorious, we with pleasure recur to it. Our list of exchanges at present probably exceeds in number that of any other weekly journal. We have dailies, semi-weeklies, weeklies and monthlies, all of which comprise over 700 different publications and from almost every part of the globe. Among our Southern exchanges we regard the Saturday Evening Post published at St. Louis and edited by W. F. Chace, as one of the most interesting and ably conducted journals that comes to our sanctum.

A New Semi-Monthly Magazine.

We have received from the publishers the first number of a new periodical called "The Empire Magazine," which promises to be a very interesting literary publication. It is embellished with cuts from original designs and published semi-monthly, on fine paper, at $3 per annum, each number containing 32 pages. Published at 123 Fulton street, by M. H. Andrews. We shall say more of it as it advances in age.

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GEO. C. TAFT,
Worcester, Mass., April 11, 1848. a22 3m

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2 1-2	17	5 1-2	40	9 1-2	73
2 3-4	19	6	45	10	80
3	20	6 1-2	49	10 1-2	85
3 1-2	26	7	57	11	90
3 3-4	28	7 1-2	58	11 1-2	95
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Johnson's Improved Shingle Machine.

THE Subscriber having received Letters Patent for an improvement in the Shingle Machine, is now ready to furnish them at short notice, and he would request all those who want a good machine for sawing shingles, to call on him and examine the improvements he has made, as one eight in more shingles can be sawed in the same given time than by any other machine now in use.

Augusta, Maine, Oct. 1, 1847. J. G. JOHNSON.

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To Mill Owners.

HAVILAND & TUTTLE'S Patent Centre Vent Pressure Water Wheel.—These wheels are now in successful operation in many towns in Maine, Massachusetts, and Rhode Island, and are found to surpass in power and facility of adaptation any water wheel now in use. This wheel was awarded the silver medal at the Fair of the American Institute recently held in New York and a diploma at the Mechanics' Fair in Boston.

The wheels are manufactured and for sale by the FULTON IRON FOUNDRY CO., South Boston, Mass.,—where the wheels can be seen and any information concerning them had.

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Stained Glass.

When certain metallic oxides or chlorides ground up with proper fluxes, are painted upon glass, their colors fuse into its surface at a moderate heat, and make durable pictures, which are frequently employed in ornamenting the windows of churches as well as of other public and private building. The colors of stained glass are all transparent, and are therefore to be viewed only by transmitted light. Many metallic pigments which afford a fine effect when applied cold on canvas or paper, are so changed by vitreous fusion as to be quite inapplicable to painting in stained glass.

The glass proper for receiving, these vitrefying pigments, should be colorless, uniform, and difficult of fusion; for which reason, crown glass, made with little alkali, or with kelp is preferred. When the design is too large to be contained on a single pane, several are fitted together, and fixed in a bed of soft cement while painting, and then taken asunder to be separately subjected to the fire. In arranging the glass pieces, care must be taken to distribute the joinings so that the lead frame-work may interfere as little as possible with the effect.

A design must be drawn upon paper, and placed beneath the plate of glass; though the artist cannot regulate his tints directly by his palette, but by specimens of the colors producible from his palette pigments after they are fired. The upper side of the glass being sponged over with gum-water, affords, when dry, a surface proper for receiving the colors, without the risk of their running irregularly, as they would be apt to do, on the slippery glass. The artist first draws on the plate, with a fine pencil, all the traces which mark the great outlines and shades of the figures. This is usually done in black, or, at least, some strong color, such as brown, blue, green or red. In laying, on these, the painter is guided by the same principles as the engraver, when he produces the effect of light and shade by dots, lines, or hatches; and he employs that color to produce the shades, which will harmonize best with the color which is to be afterwards applied; but, for the deeper shades, black is in general used. When this is finished, the whole picture will be represented in lines or hatches similar to an engraving finished up to the highest effect possible; and afterwards, when it is dry, the vitrifying colors are laid on by means of larger hair pencils; their selection being regulated by the burnt specimen tints. When he finds it necessary to lay two colors adjoining, which are apt to run together in the kiln, he must apply one of them to the back of the glass. But the few principle colors to be presently mentioned, are all fast colors, which do not run, except the yellow, which must, therefore be laid on the opposite side. After coloring, the artist proceeds to bring out the lighter effects by taking off the color in the proper place, with a goose-quill cut like a pen without a slit. By working this upon the glass, he removes the color where lights should be the strongest; such as the hair, eyes, the reflection of bright surfaces and light parts of draperies. The blank pen may be employed either to make the lights by lines, or hatches, and dots, as is most suitable to the subject.

By the metallic preparations now laid upon it, the glass is made ready for being fired, in order to fix and bring out the proper colors. The furnace or kiln best adapted for this purpose, is similar to that used by enamellers. It consists of a muffle or arch of fire-clay, or pottery, so set over a fire-place and so surrounded by flues, as to receive a very considerable heat within, in the most equable and regular manner; otherwise some parts of the glass will be melted; while, on others, the superficial film of colors will remain unvitrified. The mouth of the muffle, and the entry for introdueing fuel to the fire, should be on opposite sides, to prevent as much as possible the admission of dust into the muffle, whose mouth should be closed with double-folding-doors of iron, furnished with small peep-holes, to allow the artist to watch the progress of staining, and to withdraw small trial slips of glass, painted with the principal tints used in the picture.

The muffle must be made of very refractory fire-clay, flat at its bottom, and only five or six inches high, with such an arched top as to make the roof strong, and so close on all sides as to exclude entirely the smoke and flame. On the bottom of the muffle a smooth bed of sifted lime, freed from water, about half an inch thick, must be prepared for receiving the pane of glass. Sometimes several plates of glass are laid over each other with a layer of dry pulverulent lime between each. The fire is now lighted, and most gradually raised, lest the glass should be broken; and after it has attained to its full heat, it must be kept up for three or four hours, more or less, according to the indications of the trial slips; the yellow color being principally watched, as it is found to be the best criterion of the state of the others. When the colors are properly burnt in, the fire is suffered to die away, so as to anneal the glass.

For the Scientific American.

Silvering and Gilding by Powdered Tin.

A quantity of pure tin is melted and poured into a box, which is then violently shaken, the metal assumes when cold the form of a very fine gray powder. This is sifted to separate any coarse particles, and is mixed with melted glue. When it is to be applied it should be reduced by the addition of water to the consistence of thin cream and is laid on with a soft brush like paint. It appears when dry like a coat of gray water color, but when its gone over with an agate burnisher, it exhibits a bright surface of polished tin. If the glue is too strong the burnisher has no effect, and if too weak the tin crumbles off under the burnisher A coating of white or gold colored oil varnish or lacquer, is immediately laid over it, according as it may be intended to imitate silvering or gilding. This kind of gild ing is often used for covering wood, leather, iron or other articles in constant wear. It is very ornamental and resists the effects the weather.

For the Scientific American.

Simple way to make Oxygen Gas.

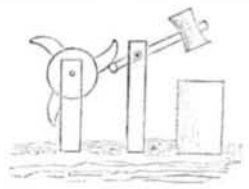
Heating equal weights of peroxide of copper and chlorate of potash is a very good way of obtaining oxygen, but any heavy metallic body will just do as well as the peroxide of copper if it is not susceptible of much further oxidisation. The iron scales that are to be had in such abundance in every blacksmith's shop, is the cheapest substance to obtain oxygen from that can be found. Grind the scales in an old coffee mill and use the powder, heating it red hot in a retort and oxygen is plentifully obtained. The writer has frequent use for a small quantity of oxygen and he finds that he can procure it with the above substance and an old gun barrel, at little or no expense and with far less trouble than heating manganese. S. L. R.

Economy in Candles.

If you are without a rush-light, and would burn a candle all night, unless you use the following precaution, it is ten to one an ordinary one will gutter away in an hour or two, sometimes to the endangering of the house:—This may be avoided by placing as much common salt, finely powdered, as will reach from the tallow to the bottom of the black part of the wick of a partly burned candle, when, if the same be lit, it will burn very slowly yielding sufficient light for a bed-chamber; the salt will gradually sink as the tallow is consumed, the melted tallow being drawn through the salt and consumed in the wick.—*Ex.*

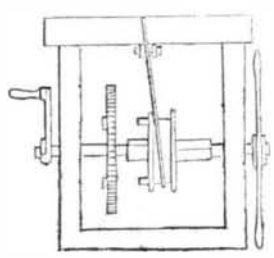
The above we have seen and tried and must pronounce it to be fallacious. Any person can try the experiment easily, and become satisfied of its worthlessness. The wicks for candles should be steeped a short time in strong lime water and then perfectly dried, is an excellent plan for wicks. Wicks should always be smooth without knots, and well-bleached

MECHANICAL MOVEMENTS.



The principle of what is called the trip hammer has long been known. It is simply a hammer suspended by the handle upon an axis and the extreme end lifted by wipers on a wheel, making the head of the hammer strike any article to be forged upon an anvil. The trip hammer, when convenient to any blacksmith's shop there is a fall of water, should never be neglected. We have been often surprised to see some blacksmiths convenient to a fine waterfall where a small wheel could be used at little expense, toiling and sweating away year in and year out at heavy forging when a small trip hammer could have done the work with thrice the expedition and with but little labor. The above cut represents a gold beater's mallet operated by a wheel with wipers where by the rotary motion of the wheel, a reciprocating motion is given to the mallet. We have to make the same complaint of gold beaters that we have of blacksmiths, generally speaking; theirs is still the beaten track of olden time. Nesmith's steam perpendicular hammer and Lewis Kirk's steam reciprocating hammer, are excellent inventions. The former is an English invention, the latter an American and patented only last year we believe. It is, however, the perpendicular hammer that alone would answer for gold beating; the least blow off the square would not answer.

Couplings.



There are many methods of coupling one part of machinery with another. Bands are employed to couple drums, and the circular sliding rack is the general plan used in the gearing and ungearing of shafts. The above cut represents another plan which is not so common. The revolution of the one wheel is transferred to the loom wheel on the same shaft by bringing the pins on the loom wheel in contact with the opening made for them in the other wheel, by means of the lever. We saw not long since a good modification of the above, for which a patent was granted, about two years ago.

The Automaton Duck of Vaucanson.

This celebrated machine, of which some marvellous, and as many regarded them, incredible stories are told, has been brought to light, and was exhibited last year in this city, where we beheld it performing its marvellous feats.

Nothing can be more authentic than the accounts of the automaton we are about to describe. We have ourselves been an eye witness, and could have sworn that the duck was a living animal. In the space of ten minutes we saw it drink, eat, dabble in the water, stretch its wings, shake its feathers, and do a number of things, all in a manner peculiar to that bird. This duck seemed to live and move—the illusion was complete.

And yet it was only a machine, made up of counterpoises, a cylinder, levers, and stops which were put in motion by means of air tubes. It was the very machine made by Vaucanson, and constructed by him in 1738, and which was then seen by all Paris. It was for a long time in the hands of Dumoulin, who exhibited it in Russia and Austria; in 1781, we hear of it at Berlin, in the possession of a counseller, named Beireis. After his death the machine was forgotten, taken to pieces, and left for thirty years in a garret, where it was much injured. At length it fell into the hands of a philosophical instrument maker, belonging to Berlin, who made vain endeavors to put it together again. A skilful mechanician belonging to Hamburg, George Tietz, fortunately learned these facts and obtained the remains of the beautiful machine. By means of great care, perseverence and skill, this Tietz has succeeded in restoring the duck, and has even added some new movements to it; but he has been obliged to make nearly the whole anew. He showed us and we beheld them with respect, the venerable pieces, which date back to the period of Vaucanson and which had been wrought by his own hand. Of the original little was left. In all instances the wood and pastebord have been replaced by steel and copper. The duck had been presented by him in a skeleton form, in order that the mechanism might be better understood, and combinations better appreciated. M. Tietz has clothed his duck with feathers, and thus rendered its resemblance to the animal more perfect.

This duck can digest his food: that is to say, he goes through the process of eating and digesting, to all appearances like any other duck.

Phosphoric Phenomena.

You must previously prepare the following phosphorus:—Calcine common oyster shells, by burning them in the fire for half an hour; then reduce them to powder; of the clearest of which take three parts, and of flowers of sulphur one part; put the mixture into a crucible, about an inch and a half deep. Let it burn in a strong fire for rather better than an hour; and when it is cool, turn it out and break it in pieces; and, taking it into a dark place, scrape off the parts that shine brightest, which, if good, will be a very white powder.

Then construct a circular board, of three or four feet diameter, on the centre of which draw in gum water, or any adhesive liquid, a half moon of three or four inches diameter, and a number of stars round it, at different distances, and of various magnitudes.

Strew the phosphorous over the figures, to the thickness of about a quarter of an inch, laying one coat over the other. Place this board behind a curtain; and when you draw the curtain up or back, discharge one electrifying jar over each figure, at the distance of about an inch, and they will become illuminated, exhibiting a very striking resemblance of the moon and stars; and will continue to shine for about half an hour, their splendor becoming gradually more faint.

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